

WHAT IS CLAIMED IS:

1. A cable modem which can be connected to a head
end system and perform a downstream communication for
receiving data from the head end system and an upstream
communication for transmitting data to the head end
5 system, the cable modem comprising:

a communication unit configured to perform a
downstream communication for receiving downstream data
from the head end system via a first channel designated
10 by the head end system and an upstream communication
for transmitting upstream data to the head end system
via a second channel designated by the head end system;

a time-out detection unit configured to determine
whether or not the downstream data is received from
15 the head end system via the first channel within
a predetermined period of time; and

a time-out notification unit configured to notify
the head end system of a detection of time-out when the
time-out detection unit does not determine that the
20 downstream data is received from the head end system
within the predetermined period of time.

2. The cable modem according to claim 1, further
comprising:

a noise measurement unit configured to measure a
25 noise in the first channel when the time-out detection
unit determines that the downstream data is received
from the head end system within the predetermined

period of time.

3. A cable modem termination system which can be connected to a cable modem and perform a data communication between the cable modem, the cable modem termination system comprising:

a communication unit configured to perform a downstream data communication via a first channel and an upstream data communication via a second channel between the cable modem; and

a time-out detection unit configured to determine whether or not the upstream data communication from the cable modem is performed within a predetermined period of time.

4. The cable modem termination system according to claim 3, further comprising:

a noise measurement unit configured to measure a noise in the second channel when the time-out detection unit determines that the upstream data communication is performed within the predetermined period of time.

5. A channel change method in a bi-directional communication system which comprises a head end system and a cable modem connected to the head end system and performs a bi-directional data communication between the head end system and the cable modem, the head end system comprising a first cable modem termination system and a second cable modem termination system, the method comprising:

performing, between the cable modem and the first cable modem termination system, a downstream communication from the first cable modem termination system to the cable modem via a first channel and an upstream communication from the cable modem to the first cable modem termination system via a second channel;

performing downstream communications from the second cable modem termination system to the cable modem via predetermined candidate channels;

determining whether or not each of the downstream communications via the predetermined candidate channels is successful;

measuring a noise in success candidate channels via which the downstream communications are successful;

and

performing a downstream communication between the head end system and the cable modem via one of the success candidate channels in which the noise is smaller than a threshold value.

6. A channel change method in a bi-directional communication system which comprises a head end system and a cable modem connected to the head end system and performs a bi-directional data communication between the head end system and the cable modem, the head end system comprising a first cable modem termination system and a second cable modem termination system, the method comprising:

performing, between the cable modem and the first cable modem termination system, a downstream communication from the first cable modem termination system to the cable modem via a first channel and an upstream communication from the cable modem to the first cable modem termination system via a second channel;

performing upstream communications from the cable modem to the second cable modem termination system via predetermined candidate channels;

determining whether or not each of the upstream communications via the predetermined candidate channels is successful;

measuring a noise in success candidate channels via which the upstream communications are successful; and

performing an upstream communication between the head end system and the cable modem via one of the success candidate channels in which the noise is smaller than a threshold value.

7. A channel change method in a bi-directional communication system which comprises a head end system and a cable modem connected to the head end system and performs a bi-directional data communication between the head end system and the cable modem, the head end system comprising a first cable modem termination system and a second cable modem termination system, the method comprising:

performing, between the cable modem and the first cable modem termination system, a downstream communication from the first cable modem termination system to the cable modem via a first channel and
5 an upstream communication from the cable modem to the first cable modem termination system via a second channel;

performing a downstream communication from the second cable modem termination system to the cable
10 modem via a third channel;

determining whether or not the downstream communications via the third channels is successful;
and

performing a downstream communication between
15 the head end system and the cable modem via the third channel when it is determined that the downstream communications via the third channels is successful.

8. A channel change method in a bi-directional communication system which comprises a head end system and a cable modem connected to the head end system and
20 performs a bi-directional data communication between the head end system and the cable modem, the head end system comprising a first cable modem termination system and a second cable modem termination system,
25 the method comprising:

performing, between the cable modem and the first cable modem termination system, a downstream

communication from the first cable modem termination
system to the cable modem via a first channel and
an upstream communication from the cable modem to
the first cable modem termination system via a second
5 channel;

performing an upstream communication from the
cable modem to the second cable modem termination
system via a third channel;

determining whether or not the upstream
10 communications via the third channels is successful;
and

performing an upstream communication between the
head end system and the cable modem via the third
channel when it is determined that the upstream
15 communications via the third channels is successful.